Calculus Warm Up #5-2

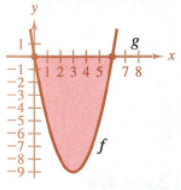
Find the area of the region bound by

$y = x^2 + 2x + 1$ and $y = 2x + 5$

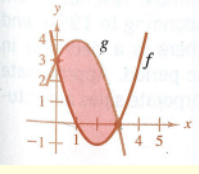
HW Questions: p. 299

In Exercises 1–6, find the area of the given region.

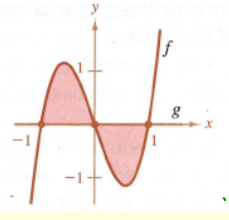
1. $f(x) = x^2 - 6x$
   $g(x) = 0$



3. $f(x) = x^2 - 4x + 3$
   $g(x) = -x^2 + 2x + 3$



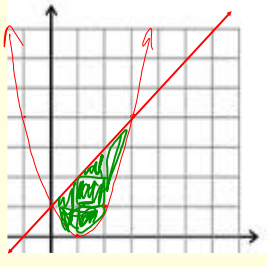
5. $f(x) = 3(x^3 - x)$
   $g(x) = 0$



In Exercises 7 and 8, determine which value best approximates the area of the region bounded by the graphs of f and g. (Make your selection on the basis of a sketch of the region and *not* by performing any calculations.)

7. $f(x) = x + 1$, $g(x) = (x - 1)^2$

   (a) -2 (b) 2 (c) 10 (d) 4 (e) 8



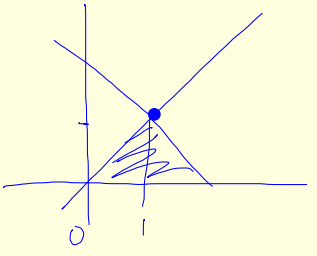
In Exercises 9–26, sketch the region bounded by the graphs of the given functions and find the area of the region.

9. $f(x) = x^2 - 4x,\ g(x) = 0$

11. $f(x) = x^2 + 2x + 1,\ g(x) = 3x + 3$

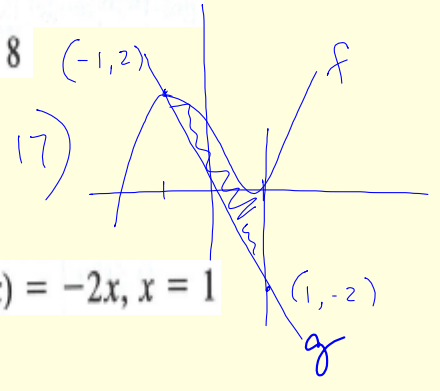
13. $y = x,\ y = 2 - x,\ y = 0$

$$2\int_0^1 x\,dx$$



In Exercises 9–26, sketch the region bounded by the graphs of the given functions and find the area of the region.

15. $f(x) = 3x^2 + 2x,\ g(x) = 8$



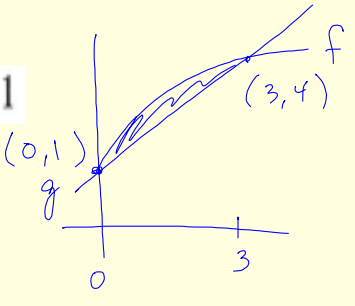
17)

17. $f(x) = x^3 - 2x + 1,\ g(x) = -2x,\ x = 1$

$$\int_{-1}^{1} (x^3 + 1)\,dx$$

19. $f(x) = \sqrt{3x} + 1,\ g(x) = x + 1$

$$\int_0^3 \left(\sqrt{3x} + 1 - (x - 1)\right) dx$$



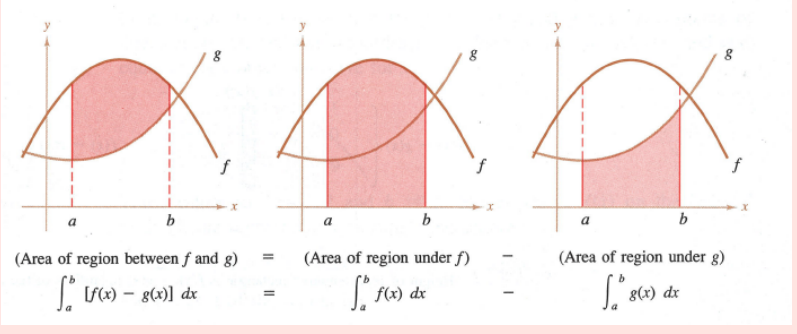
6.1 Area between two curves

Curves that intersect in more than 2 points

Area of regions with respect to y

Area between 2 curves, where f(x) > g(x)

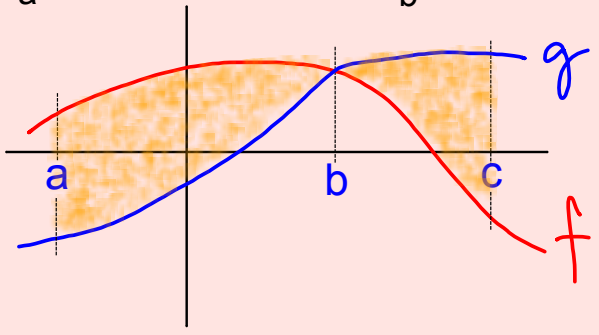
$$A = \int_a^b [f(x) - g(x)]\, dx$$



Finding Area when the curves intersect in more than 2 points:

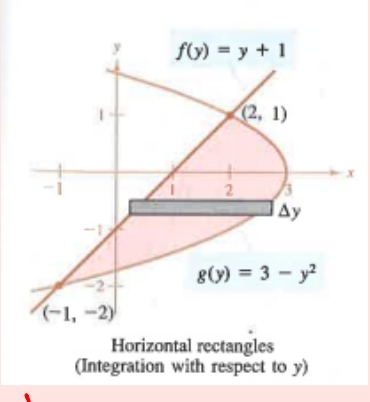
Split the integrals where f(x) > g(x) changes to g(x) > f(x)

$$A = \int_a^b [f(x) - g(x)]\,dx + \int_b^c [g(x) - f(x)]\,dx$$

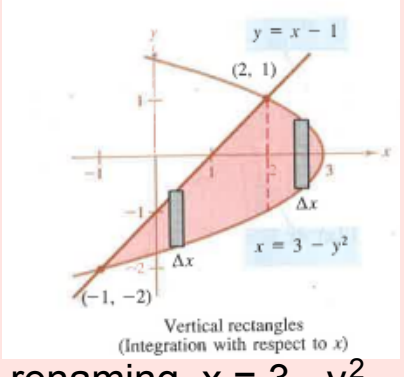


Finding Area with respect to y

$x = 3 - y^2$ and $y = x - 1$



Horizontal rectangles
(Integration with respect to y)



Vertical rectangles
(Integration with respect to x)

renaming $x = 3 - y^2$

top: $y = \sqrt{3 - x}$

bottom: $y = -\sqrt{3 - x}$

$$\int_{-2}^{1} (3 - y^2 - (y + 1))\,dy$$

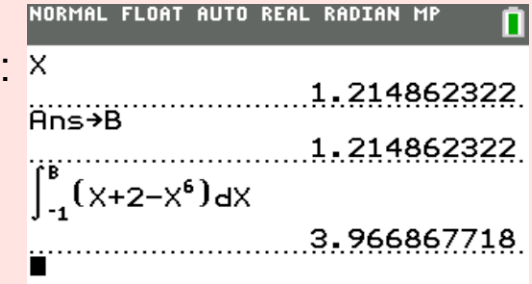
Using your calculator:

Find the area between $y = x^6$ and $y = x + 2$

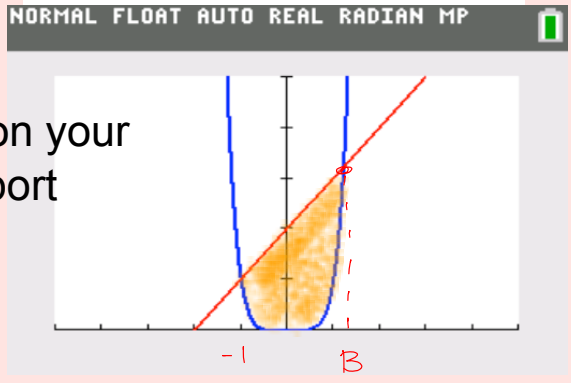
Find intersections:

store upper limit:

calculate integral:



Show graph on your paper to support your answer:



HW: p. 300 # 21 - 37 odd, and 45